



Oregon
Department
of Agriculture

Tualatin River Watershed Agricultural Water Quality Management Area Plan

June 2, 2014

DRAFT

Developed by the

Tualatin River Watershed Local Advisory Committee

Oregon Department of Agriculture

With support from the

Tualatin Soil and Water Conservation District

Tualatin SWCD
1080 Baseline St., Suite B-2
Hillsboro, OR 97123-3831
503-648-3174
www.swcd.net

Oregon Department of Agriculture
Water Quality Program
635 Capitol St. NE
Salem, OR 97301
503-986-4700

www.oregon.gov/ODA/NRD/pages/water_quality_front.aspx

DRAFT

Table of Contents

Acronyms and Terms Used in this Document	5
Foreword	7
Required Elements of Area Plans	7
Plan Content.....	7
Chapter 1: Agricultural Water Quality Management Program Purpose and Background.....	9
1.1 Purpose of Agricultural Water Quality Management Program and Applicability of Area Plans	9
1.2 History of the Ag Water Quality Program.....	9
1.3 Roles and Responsibilities	10
1.3.1 Oregon Department of Agriculture (ODA)	10
1.3.2 Local Management Agency	13
1.3.3 Local Advisory Committee (LAC)	13
1.3.4 Agriculture's Role.....	13
1.3.5 Public Participation.....	14
1.4 Agricultural Water Quality	14
1.4.1 Point and Nonpoint Sources of Water Pollution.....	14
1.4.2 Beneficial Uses and Parameters of Concern	14
1.4.3 Impaired Water Bodies and Total Maximum Daily Loads (TMDLs)	15
1.4.4 Water Pollution Control Law – ORS 468B.025 and ORS 468B.050	15
1.4.5 Streamside Vegetation and Agricultural Water Quality	16
1.5 Other Water Quality Programs	17
1.5.1 Confined Animal Feeding Operation (CAFO)	17
1.5.2 Drinking Water Source Protection	18
1.5.3 Groundwater Management Areas (GWMAs)	18
1.5.4 Oregon's Coastal Management Program and the Coastal Zone Management Act Reauthorization Amendments (CZARA) of 1990	18
1.5.5 Pesticide Management and Stewardship.....	19
1.5.6 The Oregon Plan for Salmon and Watersheds.....	19
1.6 Partner Agencies and Organizations	19
1.6.1 Oregon Department of Environmental Quality (DEQ)	19
1.6.2 Other Partners.....	20
1.7 Measuring Progress	20
1.7.1 Measurable Objectives.....	21
1.7.2 Land Condition and Water Quality.....	21
1.7.3 Focused Implementation in Small Geographic Areas.....	21
1.8 Implementation, Monitoring, Evaluation, and Adaptive Management	22
1.8.1 Statewide Aerial Photo Monitoring of Streamside Vegetation.....	22
1.8.2 Agricultural Ambient Water Quality Monitoring Assessment.....	23
1.8.3 Biennial Reviews and Adaptive Management	23
Chapter 2: Local Background	25
2.1 Local Roles and Responsibilities	26
2.1.1 Local Advisory Committee (LAC)	26
2.2 Geographical and Physical Setting.....	26

2.2.1	Location, Water Resources, Land Use, Land Ownership, Agriculture	26
2.2.2	Geographic and Programmatic Scope	27
2.3	Agricultural Water Quality in the Management Area	27
2.3.1	Local Issues of Concern	27
2.3.2	303(d) List of Impaired Water Bodies	29
2.3.3	Basin TMDLs and Agricultural Load Allocations.....	30
2.4	Prevention and Control Measures	31
2.4.1	Voluntary Measures.....	33
2.4.2	Required Conditions	35
Chapter 3:	Goals, Objectives, and Strategies	39
3.1	Goal.....	39
3.2	Measurable Objectives.....	39
3.3	Strategies for Area Plan Implementation.....	40
3.3.1	Education and Outreach.....	40
3.3.2	Conservation Planning and Conservation Activities	40
3.3.3	Funding.....	41
3.3.4	Monitoring and Evaluation	42
Chapter 4:	Implementation, Monitoring, and Adaptive Management	43
4.1	Implementation and Accomplishments.....	43
4.2	Water Quality Monitoring—Status and Trends	44
4.3	Progress Toward Measurable Objectives.....	45
4.4	Aerial Photo Monitoring of Streamside Vegetation	46
4.5	Biennial Reviews and Adaptive Management.....	47

Acronyms and Terms Used in this Document

Ag Water Quality Program – Agricultural Water Quality Management Program
Area Plan – Agricultural Water Quality Management Area Plan
Area Rules – Agricultural Water Quality Management Area Rules
CAFO – Confined Animal Feeding Operation
CNPCP – Coastal Nonpoint Pollution Control Program
CWA – Clean Water Act
CZARA – Coastal Zone Act Reauthorization Amendments
DEQ – Oregon Department of Environmental Quality
ECREP – Enhanced Conservation Reserve Enhancement Program
FSA – Farm Service Agency
GWMA – Groundwater Management Area
HUC – Hydrologic Unit Code
LAC – Local Advisory Committee
Management Area – Agricultural Water Quality Management Area
MOA – Memorandum of Agreement
NPDES – National Pollution Discharge Elimination System
NRCS – Natural Resources Conservation Service
OAR – Oregon Administrative Rules
ODA – Oregon Department of Agriculture
ODFW – Oregon Department of Fish and Wildlife
ORS – Oregon Revised Statute
OWEB – Oregon Watershed Enhancement Board
PMP – Pesticides Management Plan
PSP – Pesticides Stewardship Partnership
Regulations – Agricultural Water Quality Management Area Regulations
RUSLE – Revised Universal Soil Loss Equation
SWCD – Soil and Water Conservation District
T – Soil Loss Tolerance Factor
TMDL – Total Maximum Daily Load
TRWC – Tualatin River Watershed Council
USDA – United States Department of Agriculture
US EPA – United States Environmental Protection Agency
VEGBAC – Vegetated Buffer Areas for Conservation Program
WQPMT – Water Quality Pesticides Management Team

DRAFT

Foreword

This Agricultural Water Quality Management Area Plan (Area Plan) provides guidance for addressing agricultural water quality issues in the Agricultural Water Quality Management Area (Management Area). The purpose of this Area Plan is to identify strategies to prevent and control water pollution from agricultural lands through a combination of educational programs, suggested land treatments, management activities, compliance, and monitoring.

The provisions of this Area Plan do not establish legal requirements or prohibitions, as described in Oregon Revised Statute (ORS) 568.912(1).

Required Elements of Area Plans

Area Plans must describe a program to achieve the water quality goals and standards necessary to protect designated beneficial uses related to water quality, as required by state and federal law (Oregon Administrative Rule (OAR) 603-090-0030(1)). At a minimum, an Area Plan must:

- Describe the geographical area and physical setting of the Management Area.
- List water quality issues of concern.
- List impaired beneficial uses.
- State that the goal of the Area Plan is to prevent and control water pollution from agricultural activities and soil erosion and to achieve applicable water quality standards.
- Include water quality objectives.
- Describe pollution prevention and control measures deemed necessary by the Oregon Department of Agriculture (ODA) to achieve the goal.
 - Include an implementation schedule for measures needed to meet applicable dates established by law.
 - Include guidelines for public participation.
 - Describe a strategy for ensuring that the necessary measures are implemented.

Plan Content

Chapter 1: Agricultural Water Quality Management Program Purpose and Background. The purpose is to have consistent and accurate information about the Agricultural Water Quality Management Program.

Chapter 2: Local Background. Provides the local geographic, water quality, and agricultural context for the Management Area. Describes the water quality issues, regulations (Area Rules), and available or beneficial practices to address water quality issues.

Chapter 3: Local Goals, Objectives, and Implementation Strategies. Chapter 3 presents goal(s), measurable objectives and timelines, and strategies to achieve the goal(s) and objectives.

Chapter 4: Local Implementation, Monitoring, and Adaptive Management. ODA and the Local Advisory Committee (LAC) will work with partners to summarize land condition and water quality status. Trends are summarized to assess progress toward the goals and objectives in Chapter 3.

DRAFT

Chapter 1: Agricultural Water Quality Management Program

Purpose and Background

1.1 Purpose of Agricultural Water Quality Management Program and Applicability of Area Plans

As part of Oregon's Agricultural Water Quality Management Program (Ag Water Quality Program), this Area Plan guides landowners and partners such as Soil and Water Conservation Districts (SWCDs) in addressing local agricultural water quality issues. The purpose of this Area Plan is to identify strategies to prevent and control water pollution from agricultural activities and soil erosion (ORS 568.909(2)) on agricultural and rural lands for the area within the boundaries of the Management Area (OAR 603-090-0000(3)) and to achieve and maintain water quality standards (ORS 561.191(2)). This Area Plan has been developed and revised by ODA, the LAC, with support and input from the SWCD and the Oregon Department of Environmental Quality (DEQ). Throughout the development and revision processes, the public was invited to participate. This included public comment at meetings and public hearings during the Area Plan approval process. This Area Plan is implemented using a combination of outreach and education, conservation and management activities, compliance, monitoring, evaluation, and adaptive management.

The provisions of this Area Plan do not establish legal requirements or prohibitions (ORS 568.912(1)). Each Area Plan is accompanied by OAR regulations that describe local agricultural water quality regulatory requirements. ODA will exercise its regulatory authority for the prevention and control of water pollution from agricultural activities under the Ag Water Quality Program's general regulations (OARs 603-090-0000 to 603-090-0120) and under the regulations for this Management Area (OARs 603-095-0100). The Ag Water Quality Program's general OARs guide the Ag Water Quality Program, and the OARs for the Management Area are the regulations that landowners must follow.

This Area Plan and its associated regulations apply to all agricultural activities on non-federal and non-Tribal Trust land within the Management Area, including:

- Large commercial farms and ranches.
- Small rural properties grazing a few animals or raising crops.
- Agricultural lands that lay idle or on which management has been deferred.
- Agricultural activities in urban areas.
- Agricultural activities on land subject to the Forest Practices Act (ORS 527.610).

1.2 History of the Ag Water Quality Program

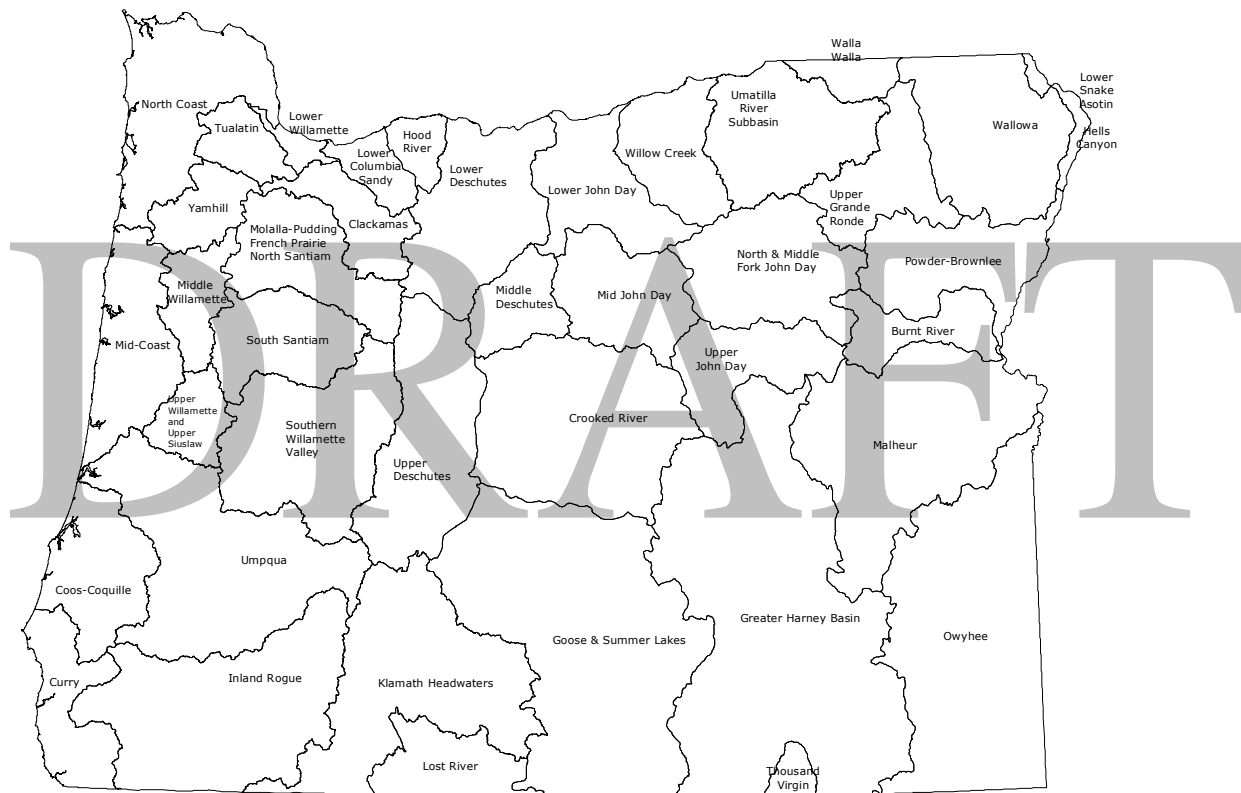
In 1993, the Oregon Legislature passed the Agricultural Water Quality Management Act, directing ODA to develop plans to prevent and control water pollution from agricultural activities and soil erosion, and to achieve water quality standards (ORS 568.900 through ORS 568.933). Senate Bill 502 was passed in 1995 to clarify that ODA regulates agriculture with respect to water quality (ORS 561.191). This Area Plan and its associated regulations were developed and subsequently revised pursuant to these statutes.

Between 1997 and 2004, ODA worked with LACs and SWCDs to develop Area Plans and associated regulations in 38 watershed-based Management Areas across Oregon (Figure 1). Since 2004, ODA, LACs, SWCDs, and other partners have focused on implementation, including:

- Providing education, outreach, and technical assistance to landowners.
- Implementing projects to improve agricultural water quality.

- Investigating complaints of potential violations of regulations.
- Conducting biennial reviews of Area Plans and regulations.
- Monitoring, evaluation, and adaptive management.
- Developing partnerships with SWCDs, state, federal, and tribal agencies, watershed councils, and others.

Figure 1: Map of 38 Agricultural Water Quality Management Areas



1.3 Roles and Responsibilities

1.3.1 Oregon Department of Agriculture (ODA)

ODA is the agency responsible for implementing the Ag Water Quality Program (ORS 568.900 to 568.933, ORS 561.191, OAR 603-090, and OAR 603-095). The Ag Water Quality Program is intended to meet the needs and requirements related to agricultural water pollution, including:

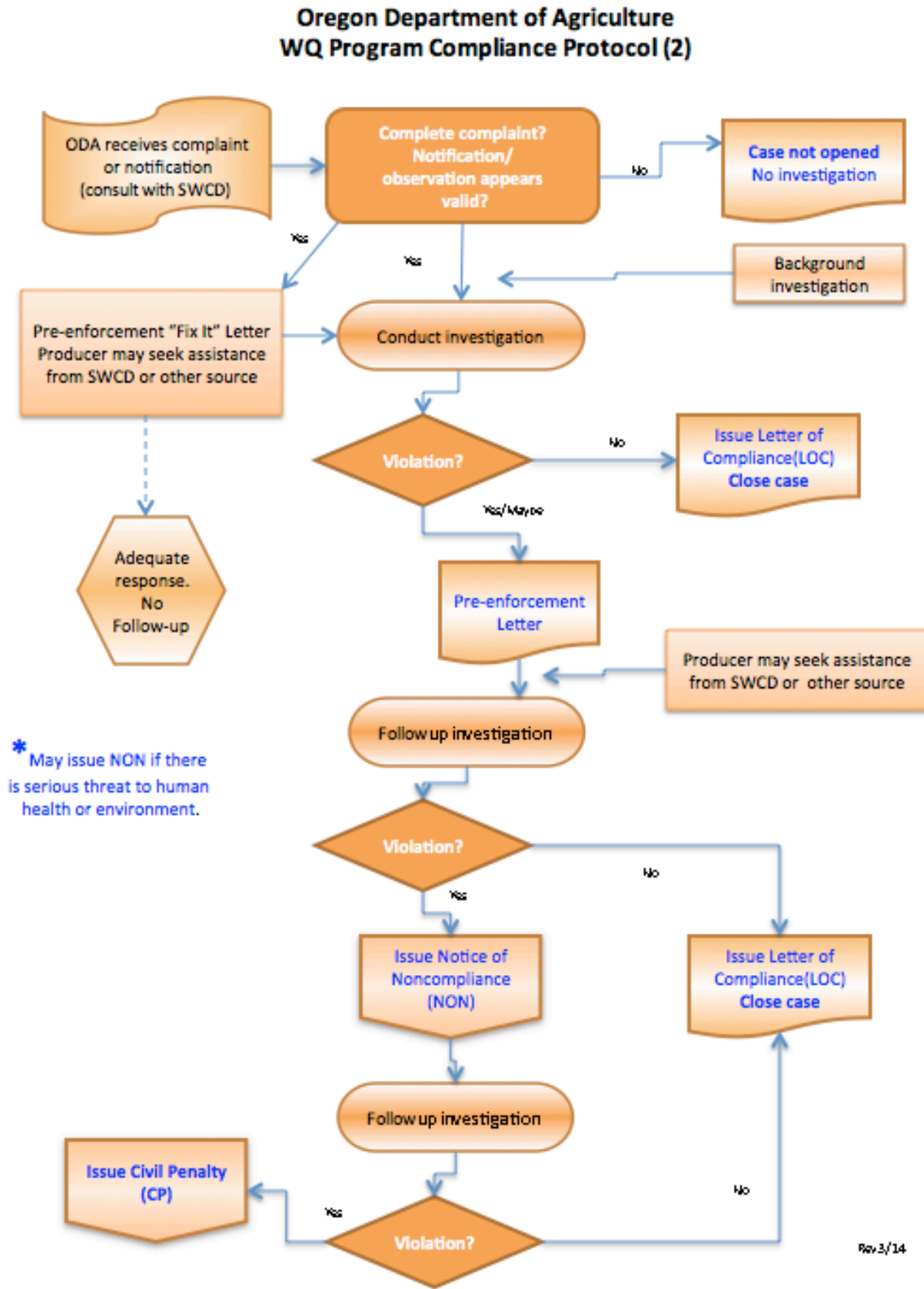
- State water quality standards.
- Load allocations for agricultural nonpoint source pollution assigned under Total Maximum Daily Loads (TMDLs) issued pursuant to the Clean Water Act (CWA), Section 303(d).
- Approved management measures for Coastal Zone Act Reauthorization Amendments (CZARA).
- Agricultural activities detailed in a Groundwater Management Area (GWMA) Action Plan (if a GWMA has been established and an Action Plan developed).

ODA has the legal authority to develop and implement Area Plans and associated regulations for the prevention and control of water pollution from agricultural activities and soil erosion, where such plans are required by state or federal law (ORS 568.909 and ORS 568.912). ODA will base Area Plans and regulations on scientific information (ORS 568.909). ODA works in partnership with SWCDs, LACs, DEQ, and other partners to implement, evaluate, and update the Area Plans and associated regulations. ODA has responsibility for any actions related to enforcement or determination of noncompliance with regulations (OAR 603-090-0080 through OAR 603-090-0120). ORS 568.912(1) and ORS 568.912(2) give authority to ODA to adopt regulations that require landowners to perform actions necessary to prevent and control pollution from agricultural activities and soil erosion.

The emphasis of this Area Plan is on voluntary action by landowners or operators to control the factors effecting water quality in the Management Area. The regulations are outlined as a set of minimum standards that must be met on all agricultural or rural lands. Landowners and operators who fail to address these regulations may be subject to enforcement procedures, which are outlined below.

Enforcement Action—ODA will use enforcement mechanisms where appropriate and necessary to gain compliance with water quality regulations. Any enforcement action will be pursued only when reasonable attempts at voluntary solutions have failed. If a violation is documented, ODA may issue a pre-enforcement notification or an Order such as a Notice of Noncompliance. If a Notice of Noncompliance is issued, the landowner or operator will be directed by ODA to remedy the condition through required corrective actions under the provisions of the enforcement procedures outlined in OAR 603-090-060 through OAR 603-090-120. If a landowner does not implement the required corrective actions, civil penalties may be assessed for continued violation of the regulations. See the Compliance Flow Chart for a diagram of the compliance process. If and when other governmental policies, programs, or regulations conflict with this Area Plan or associated regulations, ODA will consult with the agency(ies) and attempt to resolve the conflict in a reasonable manner.

Figure 2: Compliance Flow Chart



1.3.2 Local Management Agency

A Local Management Agency is an organization that ODA has designated to implement an Area Plan (OAR 603-090-0010). The legislative intent is for SWCDs to be Local Management Agencies to the fullest extent practical, consistent with the timely and effective implementation of Area Plans (ORS 568.906). SWCDs have a long history of effectively assisting landowners who voluntarily address natural resource concerns. Currently, all Local Management Agencies in Oregon are SWCDs.

The day-to-day implementation of the Area Plan is accomplished through an intergovernmental agreement between ODA and each SWCD. Each SWCD implements the Area Plan by providing outreach and technical assistance to landowners. SWCDs also work with ODA and the LAC to establish implementation priorities, evaluate progress toward meeting Area Plan goals and objectives, and revise the Area Plan and associated regulations as needed.

1.3.3 Local Advisory Committee (LAC)

For each Management Area, the director of ODA appoints an LAC (OAR 603-090-0020) with up to 12 members, to assist with the development and subsequent biennial reviews of the local Area Plan and regulations. The LAC serves in an advisory role to the director of ODA and to the Board of Agriculture. LACs are composed primarily of landowners in the Management Area and must reflect a balance of affected persons.

The LAC may meet as frequently as necessary to carry out their responsibilities, which include, but are not limited to:

- Participate in the development and ongoing revisions of the Area Plan.
- Participate in the development and revisions of regulations.
- Recommend strategies necessary to achieve goals and objectives in the Area Plan.
- Participate in biennial reviews of the progress of implementation of the Area Plan and regulations.
- Submit written biennial reports to the Board of Agriculture and the ODA director.

1.3.4 Agriculture's Role

Each individual landowner or operator in the Management Area is required to comply with the regulations, which set minimum standards. However, the regulations alone are not enough. To achieve water quality standards, individual landowners also need to attain land conditions that achieve the goals and objectives of the voluntary Area Plan. Each landowner or operator is not individually responsible for achieving water quality standards, agricultural pollution limits, or the goals and objectives of the Area Plan. These are the responsibility of the agricultural community collectively.

Technical and financial assistance is available to landowners who want to work with SWCDs (or with other local partners) to achieve land conditions that contribute to good water quality. Landowners may also choose to improve their land conditions without assistance.

Area regulations only address impacts that result from agricultural activities. A landowner is responsible for only those conditions caused by activities conducted on land managed by the landowner or occupier. Conditions resulting from unusual weather events or other circumstances not within the reasonable control of the landowner or operator are considered when making compliance decisions. Agricultural landowners may be responsible for some of the above impacts under other legal authorities.

Under the Area Plan and associated regulations, agricultural landowners and operators are not responsible for mitigating or addressing factors that do not result from agricultural activities, such as:

- Hot springs, glacial melt water, extreme or unforeseen weather events, and climate change.
- Septic systems and other sources of human waste.
- Public roadways, culverts, roadside ditches and shoulders.
- Dams, dam removal, hydroelectric plants, and non-agricultural impoundments.
- Housing and other development in agricultural areas.

1.3.5 Public Participation

The public was encouraged to participate when ODA, LACs, and SWCDs initially developed the Area Plans and associated regulations. ODA and the LAC in each Management Area, held public information meetings, a formal public comment period, and a formal public hearing. ODA and the LACs modified the Area Plans and regulations, as needed, to address comments received. The director of ODA adopted the Area Plans and regulations in consultation with the Board of Agriculture.

ODA, LACs, and SWCDs conduct biennial reviews of the Area Plans and regulations. Partners, stakeholders, and the general public are invited to participate in the process. Any future revisions to the regulations will include a public comment period and a public hearing.

1.4 Agricultural Water Quality

1.4.1 Point and Nonpoint Sources of Water Pollution

There are two types of water pollution. Point source water pollution emanates from clearly identifiable discharge points or pipes. Significant point sources are required to obtain permits that specify their pollutant limits. Agricultural operations regulated as point sources include permitted Confined Animal Feeding Operations (CAFOs) and pesticide applications in, over and within three feet of water. Many CAFOs are regulated under ODA's CAFO Program. Irrigation water discharges may be at a defined discharge point, but does not currently require a permit.

Nonpoint water pollution originates from the general landscape and is difficult to trace to a single source. Nonpoint sources include erosion and contaminated runoff from agricultural and forest lands, urban and suburban areas, roads, and natural sources. In addition, groundwater can be impacted from nonpoint sources including agricultural amendments (fertilizers and manure).

1.4.2 Beneficial Uses and Parameters of Concern

Beneficial uses of clean water include: public and private domestic water supply, industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality, hydropower, commercial navigation, and transportation. The most sensitive beneficial uses are usually fish and aquatic life, water contact recreation, and public and private domestic water supply. These uses are generally the first to be impaired as a water body if polluted, because they are affected at lower levels of pollution. While there may not be severe impacts on water quality from a single source or sector, the combined effects from all sources contribute to the impairment of beneficial uses in the Management Area. Beneficial uses that have the potential to be impacted in this Management Area are summarized in Chapter 2.

Many water bodies throughout Oregon do not meet state water quality standards. These water bodies may or may not have established water quality management plans documenting needed reductions. The most common water quality concerns related to agricultural activities are temperature, bacteria, biological criteria, sediment and turbidity, phosphorous, algae, pH, dissolved oxygen, harmful algal blooms, nitrates, pesticides, and mercury. These parameters vary by Management Area and are summarized in Chapter 2.

1.4.3 Impaired Water Bodies and Total Maximum Daily Loads (TMDLs)

Every two years, the DEQ is required by the federal Clean Water Act (CWA) to assess water quality in Oregon. CWA Section 303(d) requires DEQ to identify a list of waters that do not meet water quality standards. The resulting list is commonly referred to as the 303(d) list. DEQ, in accordance with the CWA, is required to establish TMDLs for pollutants on the 303(d) list.

A TMDL includes an assessment of water quality data and current conditions and describes a plan to restore polluted waterways to conditions that meet water quality standards. TMDLs specify the daily amount of pollution that a water body can receive and still meet water quality standards. Through the TMDL, point sources are assigned pollution limits as “waste load allocations” in permits, while nonpoint sources (agriculture, forestry, and urban) are assigned pollution limits as “load allocations.” TMDLs are legal orders issued by the DEQ, so parties assigned waste or load allocations are legally required to meet them. The agricultural sector is responsible for meeting the pollution limit (load allocation) assigned to agriculture specifically, or to nonpoint sources in general, as applicable.

TMDLs generally apply to an entire basin or subbasin, and not just to an individual water body on the 303(d) list. Once a TMDL is developed for a basin, the basin’s impaired water bodies are removed from the 303(d) list but they remain on the list of impaired water bodies. When data show that water quality standards have been achieved, water bodies will be identified on the list of water bodies that are attaining water quality standards.

As part of the TMDL process, DEQ identifies the Designated Management Agency or parties responsible for submitting TMDL implementation plans. TMDLs designate that the local Area Plan is the implementation plan for the agricultural component of the TMDLs that apply to this Management Area. Biennial reviews and revisions to the Area Plan and regulations must address agricultural or nonpoint source load allocations from TMDLs.

The list of impaired water bodies (303(d) list), the TMDLs, and the agricultural load allocations for the TMDLs that apply to this Management Area are summarized in Chapter 2.

1.4.4 Water Pollution Control Law – ORS 468B.025 and ORS 468B.050

Senate Bill 502 was passed in 1995, authorizing ODA as the state agency responsible for regulation of farming activities for the purpose of protecting water quality. A Department of Justice opinion dated July 10, 1996, states that “...ODA has the statutory responsibility for developing and implementing water quality programs and rules that directly regulate farming practices on exclusive farm use and agricultural lands.” In addition, this opinion states, “The program or rule must be designed to achieve and maintain Environmental Quality Commission’s water quality standards.”

To implement Senate Bill 502, ODA incorporated ORS 468B into all of the Area Plans and associated regulations in the state. A Department of Justice opinion, dated September 12, 2000, clarifies that ORS 468B.025 applies to point and nonpoint source pollution.

ORS 468B.025 states that:

“(1) ...no person shall:

(a) Cause pollution of any waters of the state or place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means.

(b) Discharge any wastes into the waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule for such waters by the Environmental Quality Commission.

(2) No person shall violate the conditions of any waste discharge permit issued under ORS 468B.050.”

The aspects of ORS 468B.050 that apply to the Ag Water Quality Program, state that:

“(1) Except as provided in ORS 468B.053 or 468B.215, without holding a permit from the Director of the Department of Environmental Quality or the State Department of Agriculture, which permit shall specify applicable effluent limitations, a person may not:

(a) Discharge any wastes into the waters of the state from any industrial or commercial establishment or activity or any disposal system.”

Definitions (ORS 468B.005)

“Wastes” means sewage, industrial wastes, and all other liquid, gaseous, solid, radioactive or other substances, which will or may cause pollution or tend to cause pollution of any waters of the state. Additionally, OAR 603-095-0010(53) includes but is not limited to commercial fertilizers, soil amendments, composts, animal wastes, vegetative materials, or any other wastes.

“Pollution or water pollution” means such alteration of the physical, chemical, or biological properties of any waters of the state, including change in temperature, taste, color, turbidity, silt or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive, or other substance into any waters of the state, which will or tends to, either by itself or in connection with any other substance, create a public nuisance or which will or tends to render such waters harmful, detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses or to livestock, wildlife, fish or other aquatic life or the habitat thereof.

“Water” or “the waters of the state” include lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or affect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction.

1.4.5 Streamside Vegetation and Agricultural Water Quality

Across Oregon, the Ag Water Quality Program emphasizes streamside vegetation protection and enhancement to prevent and control agricultural water pollution. Streamside vegetation provides three primary water quality functions: shade for cooler stream temperatures, streambank stability, and filtration of pollutants. Other water quality functions include: water storage for cooler and later season flows, sediment trapping that builds streambanks and floodplains, narrowing and deepening of channels, and biological uptake of sediment, organic material, nutrients, and pesticides.

Additional reasons for the Ag Water Quality Program's emphasis on streamside vegetation include:

- Streamside vegetation improves water quality related to multiple pollutants, including: temperature (heat), sediment, bacteria, nutrients, toxics, and pesticides.
- Streamside vegetation provides fish and wildlife habitat.
- Landowners can improve streamside vegetation in ways that are compatible with their operation.
- Streamside vegetation condition can be monitored readily to track the status and trends of agriculture's progress in addressing water quality concerns.

The Ag Water Quality Program uses the concept of "site-capable vegetation" to describe the vegetation that agricultural streams can provide to protect water quality. Site-capable vegetation is the vegetation that can be expected to grow at a particular site, given natural site factors (e.g., elevation, soils, climate, hydrology, wildlife, fire, floods) and historical and current human influences (e.g., channelization, roads, invasive species, modified flows, past land management). Site-capable vegetation can be determined for a specific site based on: current streamside vegetation at the site, streamside vegetation at nearby reference sites with similar natural characteristics, NRCS soil surveys, and local or regional scientific research.

The goal for Oregon's agricultural landowners is to provide the water quality functions (e.g., shade, streambank stability, and filtration of pollutants) produced by site-capable vegetation along all streams flowing through agricultural lands. The agricultural water quality regulations for each Management Area require that agricultural activities provide water quality functions consistent with what the site would provide with site-capable vegetation.

In some cases, for narrow streams, mature site-capable vegetation may not be needed. For example, shrubs and grass may provide shade, protect streambanks, and filter pollutants. However, on larger streams, mature vegetation is important. Limited exceptions include:

- Junipers are mature site-capable vegetation in central and eastern Oregon, but they reduce bank stability and increase erosion
- Upland species (such as sagebrush) can be the dominant site-capable vegetation along streams with erosional down-cutting, but they do not improve water quality

1.5 Other Water Quality Programs

1.5.1 Confined Animal Feeding Operation (CAFO)

ODA is the lead state agency for the CAFO Program. The CAFO Program was developed to ensure that operators and producers do not contaminate ground or surface water with animal manure. Since the early 1980s, CAFOs have been registered to a general Water Pollution Control Facility permit designed to protect water quality, while allowing the operators and producers to remain economically viable. A properly maintained CAFO does not pollute ground or surface water. To assure continued protection of ground and surface water, ODA was directed by the 2001 Oregon State Legislature to convert the CAFO Program from a Water Pollution Control Facility permit program to a federal National Pollutant Discharge Elimination System (NPDES) program. ODA and DEQ jointly issued a NPDES CAFO Permit in 2003 and 2009. The 2009 permit will expire in May 2014, and it is expected that a new permit will be issued at that time. The NPDES CAFO Permit is compliant with all Clean Water Act requirements for CAFOs; it does allow discharge in certain circumstances as long as the discharge does not violate Water Quality Standards.

Oregon NPDES CAFO Permits require the registrant to operate according to a site-specific, ODA approved, Animal Waste Management Plan that is incorporated into the NPDES CAFO Permit by reference. CAFO NPDES Permits protect both surface and ground water resources.

1.5.2 Drinking Water Source Protection

Oregon implements its drinking water protection program through a partnership between DEQ and the Oregon Health Authority. The program provides individuals and communities with information on how to protect the quality of Oregon's drinking water. DEQ and the Oregon Health Authority encourage community-based protection and preventive management strategies to ensure that all public drinking water resources are kept safe from future contamination. For more information see: <http://www.deq.state.or.us/wq/dwp/dwp.htm>. Agricultural activities are required to meet those water quality standards that contribute the safe drinking water.

1.5.3 Groundwater Management Areas (GWMAs)

Groundwater Management Areas are designated by DEQ when groundwater in an area has elevated contaminant concentrations resulting, at least in part, from nonpoint sources. Once the GWMA is declared, a local groundwater management committee comprised of affected and interested parties is formed. The committee then works with and advises the state agencies that are required to develop an action plan that will reduce groundwater contamination in the area.

Oregon has designated three GWMAs because of elevated nitrate concentrations in groundwater. These include the Lower Umatilla Basin GWMA, the Northern Malheur County GWMA, and the Southern Willamette Valley GWMA. Each GWMA has a voluntary Action Plan to reduce nitrate concentrations in groundwater. If after a scheduled evaluation point DEQ determines that the voluntary approach is not effective, then mandatory requirements may become necessary.

1.5.4 Oregon's Coastal Management Program and the Coastal Zone Management Act Reauthorization Amendments (CZARA) of 1990

The mission of the Oregon Coastal Management Program is to work in partnership with coastal local governments, state and federal agencies, and other stakeholders to ensure that Oregon's coastal and ocean resources are managed, conserved, and developed consistent with statewide planning goals. Oregon's Coastal Nonpoint Pollution Control Program (CNPCP) has been developed in compliance with requirements of Section 6217 of the CZARA. CZARA is administered at the federal level by the US EPA and the National Oceanic and Atmospheric Administration (NOAA). The federal requirements are designed to restore and protect coastal waters from nonpoint source pollution and require coastal states to implement a set of management measures based on guidance published by the US EPA. The guidance contains measures for the following areas: agricultural activities, forestry activities, urban areas, marinas, hydro-modification activities, and protecting wetlands. In Oregon, the program is coordinated by the Department of Land Conservation and Development and DEQ. The geographical boundaries for the CNPCP include North Coast, Mid-Coast, South Coast, Rogue, and Umpqua basins. Oregon identified coastal Agricultural Water Quality Management Area Plans and Rules as the state's strategy to address agricultural measures. This Area Plan and associated regulations are designed to meet the requirements of the CZARA and to implement agriculture's part of Oregon's CNPCP.

Additional information about CZARA and Oregon's CNPCP can be located at:
http://www.oregon.gov/LCD/OCMP/pages/watqual_intro.aspx

1.5.5 Pesticide Management and Stewardship

The ODA Pesticides Program holds the primary responsibility for registering pesticides and regulating their use in Oregon, under the Federal Insecticide Fungicide Rodenticide Act. ODA's Pesticide Program administers regulations relating to pesticide sales, use, and distribution, including pesticide operator and applicator licensing, as well as proper application of pesticides, pesticide labeling, and registration.

In 2007, the interagency Water Quality Pesticide Management Team (WQPMT) was formed to expand efforts to improve water quality in Oregon related to pesticide use. The WQPMT includes representation from ODA, Oregon Department of Forestry, DEQ, and the Oregon Health Authority. The WQPMT facilitates and coordinates activities such as monitoring, analysis and interpretation of data, effective response measures, and management solutions. The WQPMT relies on monitoring data from the Pesticides Stewardship Partnership (PSP) Program and other monitoring programs to assess the possible impact of pesticides on Oregon's water quality. Pesticide detections can be addressed through multiple programs and partners, including the PSP Program described above.

Through the PSP Program, state agencies and local partners work together to monitor pesticides in streams and to improve water quality (<http://www.deq.state.or.us/wq/pesticide/pesticide.htm>). DEQ, ODA, and Oregon State University Extension Service work with landowners, SWCDs, watershed councils, and other local partners to voluntarily reduce pesticide levels while improving water quality and crop management. There has been noteworthy progress since 2000 in reducing pesticide concentrations and detections.

ODA led the development and implementation of a Pesticides Management Plan (PMP) for the state of Oregon (http://www.oregon.gov/ODA/PEST/water_quality.shtml). The PMP, completed in 2011, strives to protect drinking water supplies and the environment from pesticide contamination, while recognizing the important role that pesticides have in maintaining a strong state economy, managing natural resources, and preventing human disease. The PMP sets forth a process for preventing and responding to pesticide detections in Oregon's ground and surface water resources by managing the pesticides that are currently approved for use by the US EPA and Oregon in both agricultural and non-agricultural settings.

1.5.6 The Oregon Plan for Salmon and Watersheds

In 1997, Oregonians began implementing the Oregon Plan for Salmon and Watersheds referred to as the Oregon Plan (<http://www.oregon-plan.org>). The Oregon Plan seeks to restore native fish populations, improve watershed health, and support communities throughout Oregon. The Oregon Plan has a strong focus on salmon, because they have such great cultural, economic, and recreational importance to Oregonians, and because they are important indicators of watershed health. ODA's commitment to the Oregon Plan is to develop and implement Area Plans and associated regulations throughout Oregon.

1.6 Partner Agencies and Organizations

1.6.1 Oregon Department of Environmental Quality (DEQ)

The US EPA has delegated authority to DEQ under the CWA authority for protection of water quality in Oregon. In turn, DEQ is the lead state agency with overall authority to regulate for water quality in Oregon. DEQ coordinates with other state agencies, including ODA and Oregon Department of Forestry, to meet the needs of the CWA. DEQ sets water quality standards and develops TMDLs for impaired water bodies. In addition, DEQ develops and coordinates programs to address water quality including National Pollution Discharge Elimination Permits (for point sources), 319 program, Source Water

Protection, 401 Water Quality Certification, and GWMA. DEQ also coordinates with ODA to help ensure successful implementation of Area Plans as part of its 319 program.

DEQ designated ODA as the Designated Management Agency for water pollution control activities on agricultural and rural lands in the state of Oregon to coordinate meeting agricultural TMDL load allocations. A Memorandum of Agreement (MOA) between DEQ and the ODA recognizes that ODA is the agency responsible for implementing the Ag Water Quality Program established under ORS 568.900 to ORS 568.933, ORS 561.191, and OAR Chapter 603, Divisions 90 and 95. The MOA between ODA and DEQ was updated in 2012 and describes how the agencies will work together to meet agricultural water quality requirements.

The MOA includes the following commitments:

- ODA will develop and implement a monitoring strategy, as resources allow, in consultation with DEQ.
- ODA will evaluate Area Plans and regulation effectiveness in collaboration with DEQ.
 - ODA will determine the percentage of lands achieving compliance with Management Area regulations.
 - ODA will determine whether the target percentages of lands meeting the desired land conditions, as outlined in the goals and objectives of the Area Plans, are being achieved.
- ODA and DEQ will review and evaluate existing information with the objective of determining:
 - Whether additional data are needed to conduct an adequate evaluation.
 - Whether existing strategies have been effective in achieving the goals and objectives of the Area Plan.
 - Whether the rate of progress is adequate to achieve the goals of the Area Plan.

The Environmental Quality Commission, which serves as DEQ's policy and rulemaking board, may petition ODA for a review of part or all of any Area Plan or its associated regulations. The petition must allege with reasonable specificity that the Area Plan or associated regulations are not adequate to achieve applicable state and federal water quality standards (ORS 568.930(3)(a)).

1.6.2 Other Partners

ODA and SWCDs work in close partnership with local, state, and federal agencies and organizations, including: DEQ (as indicated above), the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) and Farm Service Agency (FSA), watershed councils, Oregon State University Cooperative Extension Service, livestock and commodity organizations, conservation organizations, and local businesses. As resources allow, SWCDs and local partners provide technical, financial, and educational assistance to individual landowners for the design, installation, and maintenance of effective management strategies to prevent and control agricultural water pollution.

1.7 Measuring Progress

Agricultural landowners and operators have implemented effective conservation projects and management activities throughout Oregon to improve water quality for many years. However, it has been challenging for ODA, SWCDs, and LACs to measure this progress. ODA is working with SWCDs, LACs, and our partners to develop and implement objectives and strategies that will produce measurable outcomes for agricultural water quality.

1.7.1 Measurable Objectives

Measurable objectives allow the Ag Water Quality Program to better evaluate progress toward meeting water quality standards and load allocations where TMDLs have been completed. Many of these measurable objectives relate to land condition and are mainly implemented through focused work in small geographic areas (section 1.7.3). The measurable objectives for this Area Plan are in Chapter 3, and progress toward achieving the objectives is summarized in Chapter 4.

At a minimum, the measurable objectives of the Ag Water Quality Program and this Area Plan are to:

- Increase the percentage of lands achieving compliance with the regulations.
- Increase the percentage of lands meeting desired land conditions outlined in the Area Plan.

1.7.2 Land Condition and Water Quality

Land conditions can serve as useful surrogates (indicators) for water quality parameters. For example, streamside vegetation is generally used as a surrogate for water temperature, because shade blocks solar radiation from warming the stream. In addition, sediment can be used as a surrogate for pesticides and nutrients, because many pesticides and nutrients adhere to sediment particles.

The Ag Water Quality Program focuses on land conditions, in addition to water quality data, for several reasons:

- Landowners can see land conditions and have direct control over them.
- It can be difficult to separate agriculture's influence on water quality from other land uses.
- It requires extensive monitoring of water quality at an intensive temporal scale to evaluate progress; it is expensive and may fail to demonstrate short-term improvements.
- Improved land conditions can be documented immediately, but there may be a significant lag time or a need for more extensive implementation before water quality improves.
- Agricultural improvements in water pollution are primarily through improvements in land and management conditions.

Water quality monitoring data may help ODA and partners to measure progress or identify problem areas in implementing the Area Plan; although, as described above, it may be less likely to evaluate the short-term effects of changing land conditions on water quality parameters such as temperature, bacteria, nutrients, sediment, and pesticides.

1.7.3 Focused Implementation in Small Geographic Areas

Focus Areas

A Focus Area is a small watershed with significant water quality or land condition concerns that are associated with agriculture. ODA's intent in selecting Focus Areas is to deliver systematic, concentrated outreach and technical assistance in small geographic areas ("Focus Areas") through the SWCDs. A key component of this approach is measuring conditions before and after implementation to document the progress made with available resources. The focused implementation approach is consistent with other agencies' and organizations' efforts to work proactively in small geographic areas, and is supported by a large body of scientific research (e.g., Council for Agricultural Science and Technology, 2012).

Systematic implementation in Focus Areas can provide the following advantages:

- Measuring progress is easier in a small watershed than across an entire Management Area.
- Water quality improvement may be faster since small watersheds generally respond more rapidly.
- A proactive approach can address the most significant water quality concerns.

- Partners can coordinate and align technical and financial resources.
- Partners can coordinate and identify the appropriate source specific conservation practices and demonstrate the effectiveness of these conservation practices.
- A higher density of projects allows neighbors to learn from neighbors.
- A higher density of prioritized projects leads to greater connectivity of projects.
- Limited resources are used more effectively and efficiently.
- Work in one Focus Area, followed by other Focus Areas, will eventually cover the entire Management Area.

SWCDs choose a Focus Area in cooperation with ODA and other partners. In some cases, a Focus Area is selected because of efforts already underway or landowner relationships already established. The scale of the Focus Area matches the SWCD's capacity to deliver concentrated outreach and technical assistance, and to complete (or initiate) projects over a biennium. The current Focus Area for this Management Area is described in Chapter 3.

Working within a Focus Area is not intended to prevent implementation within the remainder of the Management Area. The remainder of the Management Area will continue to be addressed through general outreach and technical assistance.

Strategic Implementation Areas

Strategic Implementation Areas are small watersheds selected by ODA, in cooperation with partners, and after review of water quality and other available information. ODA leads the assessment of current conditions and the landowner outreach. Strategic Implementation Areas and Focus Areas are both tools to concentrate efforts in small geographic areas to achieve water quality standards. As with Focus Areas, SWCDs and partners work with landowners to improve conditions that may impact water quality. However, Strategic Implementation Areas also have a compliance evaluation and assurance process that allows ODA to proactively gain compliance with Ag water quality regulations.

1.8 Implementation, Monitoring, Evaluation, and Adaptive Management

Implementation of the Area Plan and associated regulations will be assessed by evaluating the status and trends in agricultural land conditions. Measurable objectives will be assessed across the entire Management Area and within the Focus Area. ODA conducts land condition and water quality monitoring at the statewide level and will analyze this and other agencies' and organizations' local monitoring data. The results and findings will be summarized in Chapter 4 for each biennial review. ODA, DEQ, SWCDs, and LACs will examine these results during the biennial review and will revise the goal(s), objectives, and strategies in Chapter 3, as needed.

1.8.1 Statewide Aerial Photo Monitoring of Streamside Vegetation

Starting in 2003, ODA began evaluating streamside vegetation conditions using aerial photos acquired specifically for this purpose. ODA focuses on land condition monitoring efforts on streamside areas because these areas have such a broad influence over water quality. Stream segments representing 10 to 15 percent of the agricultural lands in each Management Area were randomly selected for monitoring. ODA examines streamside vegetation at specific points in 90-foot bands along the stream from the aerial photos and assigns each sample stream segment a score based on ground cover. The score can range from 70 (all trees) to 0 (all bare ground). The same stream segments are re-photographed and re-scored every five years to evaluate changes in streamside vegetation conditions over time. Because site capable

vegetation varies across the state, there is no one correct riparian index score. The main point is to measure positive or negative change. The results are summarized in Chapter 4 of the Area Plan.

1.8.2 Agricultural Ambient Water Quality Monitoring Assessment

ODA currently evaluates water quality data from monitoring sites in DEQ's water quality database that reflects agricultural influence on water quality. These data are also published in the DEQ water quality database and evaluated at the statewide level to determine trends in water quality at agricultural sites statewide. Results from monitoring sites in the Management Area, along with local water quality monitoring data, are described in Chapter 4.

1.8.3 Biennial Reviews and Adaptive Management

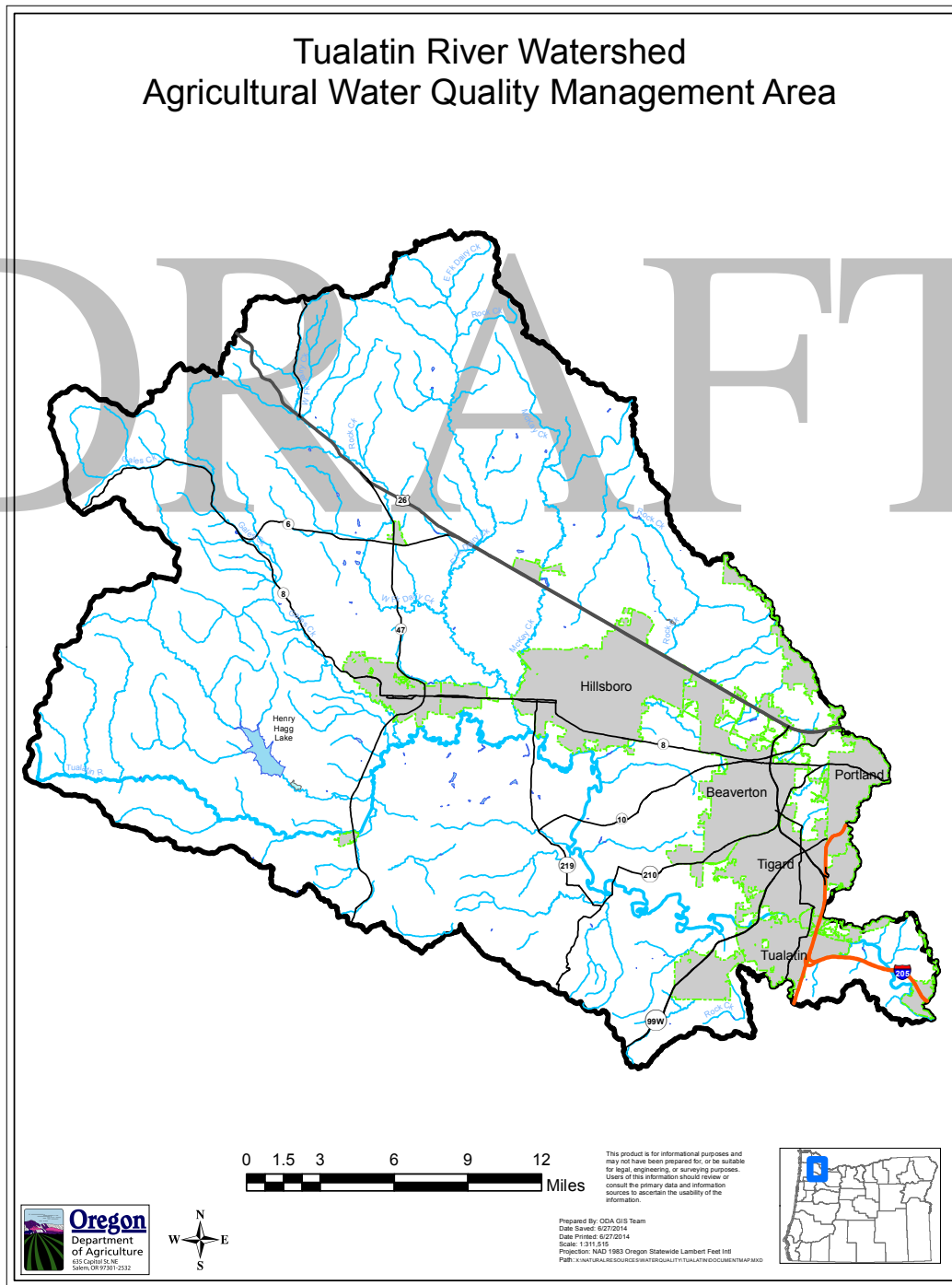
The Area Plan and associated regulations undergo biennial reviews by ODA and the LAC. As part of each biennial review, ODA, DEQ, SWCDs, and the LAC discuss and evaluate the progress on implementation of the Area Plan and associated regulations. This evaluation includes enforcement actions, landscape and water quality monitoring, and outreach efforts over the past biennium across the Management Area and for the Focus Area. In addition, progress toward achieving agricultural load allocations may be documented (if a TMDL has been established). As a result of the biennial review, the LAC submits a report to the Board of Agriculture and the director of ODA. This report describes progress and impediments to implementation, and recommendations for modifications to the Area Plan or associated regulations necessary to achieve the purpose of the Area Plan. The results of this evaluation will be used to update the goal(s), measurable objectives, and strategies in Chapter 3.

DRAFT

Chapter 2: Local Background

The Management Area consists of the Tualatin River watershed. The boundaries are the same as those defined by the US Geologic Survey for the 5th field Tualatin Subbasin Hydrologic Unit (Figure 3).

Figure 3. Map of Management Area



2.1 Local Roles and Responsibilities

The ODA and the Tualatin SWCD intend to implement this Area Plan in mutual cooperation with private landowners, DEQ, USDA NRCS, Farm Services Agency, OSU Extension Service, Clean Water Services, private organizations, and federal, state, and local agencies.

Implementation of this Area Plan is accomplished through an Intergovernmental Agreement between ODA and the Tualatin SWCD. This Agreement defines the Tualatin SWCD as the Local Management Agency for implementation of the Area Plan. The Tualatin SWCD was also involved in development of the Area Plan and associated regulations.

2.1.1 Local Advisory Committee (LAC)

This Area Plan was developed with the assistance of an LAC. The LAC was formed in 1995 to assist with the development of the Area Plan and regulations and with subsequent biennial reviews (Table 1). The LAC has met regularly to review the Area Plan and regulations since its adoption by the ODA director in 1996.

Table 1. Current Local Advisory Committee (LAC) members		
Name	Location	Description
Dan Logan, Chair	North Plains	Farming, timber
Nicole Anderson	Basin-wide	OSU Extension
Dave Krahmer	Cornelius	Vegetables; Farm Bureau
Larry Landauer	Forest Grove	Plant nursery
Jim Love	Forest Grove	Berries; Tualatin Valley Irrigation District
Roy Malensky	Hillsboro	Berries
George Marsh	Cornelius	Dairy
Bruce Roll	Hillsboro	Clean Water Services
Bob Terry	Gaston	Plant nursery
Jerry Ward	Newberg	Filberts, horses; SWCD Board
Brian Wegener	Tualatin	Riverkeepers
Rich Hunter, alternate		
Jeff Malensky, alternate		

2.2 Geographical and Physical Setting

2.2.1 Location, Water Resources, Land Use, Land Ownership, Agriculture

The Tualatin River Watershed is a 712 square mile drainage area encompassing most of Washington and portions of Clackamas, Columbia, Multnomah, Tillamook, and Yamhill counties in northwest Oregon. The fractions of the watershed outside of Washington County are small, together making up only nine percent of the watershed area. The 84-mile long Tualatin River originates in Oregon's Coast Range and flows generally eastward, discharging into the Willamette River at West Linn. The watershed has a modified marine climate with a very definite winter rainfall pattern. Peak flows normally occur in January, receding to sluggish base flow conditions in the summer months. Summer flows are augmented with releases from Hagg Lake and Barney Reservoir.

Home to over 500,000 people, the watershed is approximately 15 percent urban, 35 percent farmland (including natural areas) and 50 percent forest. Major cities include Hillsboro, Beaverton, Forest Grove, Tigard, and Tualatin. Five percent of the watershed is managed by the state of Oregon and two percent is

Tualatin River Watershed Water Quality Management Area Plan June 2, 2014 Page 26

managed by the Bureau of Land Management. The remainder of the watershed is privately owned or in municipal use.

Agriculture is a significant land use within the watershed, with approximately 25 percent of the land used for commercial agriculture. Agriculture is very important to the economy of the area, and agricultural lands in the watershed provide a high dollar return per acre. Washington County ranked seventh for agricultural gross income in the state in 2012, with gross agricultural sales exceeding \$292,000,000 (2012 Oregon County and State Agricultural Estimates. Oregon State University Extension Service. May 2013).

2.2.2 Geographic and Programmatic Scope

Operational boundaries for the land under the purview of this Area Plan include all lands within the Management Area in agricultural use, and agricultural and rural lands that are lying idle or on which management has been deferred, with the exception of activities subject to the Forest Practices Act. Agricultural use means the use of land for the raising or production of livestock or livestock products, poultry or poultry products, milk or milk products, fur-bearing animals; or for the growing of crops such as, but not limited to, grains, small grains, fruit, vegetables, forage grains, nursery stock, Christmas trees; or any other agricultural or horticultural use or animal husbandry or any combination thereof. Wetlands, pasture, and woodlands accompanying land in agricultural use are also under the purview of this Area Plan.

Current productive agricultural use or profitability is not required for the provisions of the Area Plan to apply. Highly erodible lands with no present active use are included under Area Plan jurisdiction.

This Area Plan will address the following water quality issues and activities related to lands in agricultural use:

- Erosion and surface water management
- Irrigation water management
- Nutrient management
- Pesticide management
- Permitted Confined Animal Feeding Operations (CAFOs)
- Animal enterprises not subject to CAFO permits
- Riparian area and wetlands vegetation

2.3 Agricultural Water Quality in the Management Area

2.3.1 Local Issues of Concern

Every water body in the Management Area contains some level of contaminants. The problem spans streams, creeks, rivers, lakes, ponds, construction sites, clearing and grading areas, and areas with septic systems. The Tualatin River and tributaries are used for fish and wildlife, irrigation, drinking water, supporting industries, and recreation such as swimming, fishing and boating. All of these beneficial uses are affected by the water quality in the Management Area.

In the past, most water quality problems were traced to the most obvious cause: point source pollution. Since point source pollution is any pollution source that comes from a specific location, such as a pipe discharging pollutions directly into the river, the problem can usually be traced back up the pipe to the source. Much progress has been made in preventing further water quality problems from point sources.

Nonpoint source pollution is more difficult to control because the sources are often hard to identify and difficult to measure. This type of pollution results from a variety of activities. Nonpoint source pollution can be the water that runs off crop, forest, and urban landscapes. Nonpoint sources include contaminated agricultural lands, livestock operations, eroding streambanks and roadsides, failing septic systems, runoff from parking lots and construction sites, and irrigation and drainage systems. Pollutants from nonpoint sources are carried to the surface water or groundwater through the action of rainfall, irrigation runoff, erosion, and seepage.

In response to the Federal Clean Water Act (CWA) of 1972, the DEQ listed the Tualatin River and its tributaries as "water quality limited." In 1998, 274 out of 898 stream miles in the Tualatin Watershed were listed for one or more of the following parameters: bacteria, dissolved oxygen, temperature, pH, biological criteria (aquatic life), chlorophyll a, and toxics (iron, arsenic, and manganese).

Oxygen is necessary to all forms of life, but too much or too little oxygen in the system can kill organisms. Dissolved oxygen gets into water by diffusion from the surrounding air, by aeration (rapid movement), and as a byproduct of photosynthesis. As dissolved oxygen levels in water drop, many aquatic species are stressed. According to the DEQ, the two factors that most affect dissolved oxygen concentrations in the tributaries are temperature and sediment oxygen demand (the decomposition of bottom sediments, which consumes dissolved oxygen).

During summer months, **water temperature** in the Tualatin watershed is much too high for fish. Salmon and trout need cool water temperatures to rear young and survive. When water is too warm, salmon and trout experience many negative effects, ranging from decreased spawning success to death. In addition, warm water encourages bacteria to grow and dissolved oxygen levels to decrease. Summer water temperatures in at least 19 stream segments in the Tualatin watershed exceed water quality criteria. According to DEQ, the primary causes of increased water temperature are the lack of riparian vegetation and the discharge of warmer water from point sources. Other influences include water withdrawal, water releases from reservoirs, and changes in channel morphology such as increased channel width with shallower depth.

Bacterial contamination of waterways can affect the health of people, crops, fish and others who use the water. Bacteria can enter waterways through several different routes. The highest levels of bacteria in the Tualatin watershed generally occur during periods of storm-water runoff due to rain events. Sources of bacteria include failing septic systems, pet waste, other animal wastes, and illegal dumping.

Every resident is affected by the level of **nutrients** (nitrogen, phosphorus) and animal waste that enters our waterways. Nutrients can occur naturally in streams and rivers, but elevated concentrations are often the result of pollution due to human activities. Phosphorus has been identified as the most important nutrient that must be kept out of surface water. Nutrients, particularly phosphorus, promote the growth of algae. Algae uses up the oxygen fish and other aquatic life need to survive. It makes water murky (turbid), can produce ugly algal blooms, and causes water's pH to change, damaging fish and other animals. Sources of phosphorus include animal and human waste, fertilizers, and other organic material or geologic sources.

High levels of phosphorus and nitrogen from agricultural operations threaten the streams in the Upper Tualatin Watershed. Excess nutrients in the system can produce harmful algae blooms, similar to the one that occurred upstream of the drinking water and irrigation water take-outs on the Upper Tualatin River in 2008. The species of blue-green algae observed in that bloom (*Anabaena flos-aquae*), has the potential to produce both liver and neurotoxins. This incident was associated with a fish kill below Wapato Lake and significantly increased water treatment costs (approximately \$300,000) at the Joint Water Commission drinking water takeout. The algae may have caused crop damage and endangered farm-worker health.

Mercury occurs naturally and is used in many products. It enters the environment through human activities and from volcanoes, and can be carried long distances by atmospheric air currents. Mercury passes through the food chain readily, and can significantly harm humans and wildlife through the consumption of contaminated fish. Mercury in water comes from erosion of soil that carries naturally occurring mercury (including erosion from agricultural lands and streambanks) and from deposition on land or water from local or global atmospheric sources.

Amendments to the federal Safe Drinking Water Act in 1996 directed and empowered states to begin or expand efforts to protect sources of drinking water. In 2003, Oregon DEQ and the Department of Human Services (now the Oregon Health Authority) identified vulnerable areas and potential threats for municipal drinking water sources. Pesticides and nutrients are two potential pollutants of concern that could be contributed by agricultural sources. To date, monitoring data have shown low levels of these pollutants at Tualatin drinking water intakes.

While there may not be severe impacts on water quality from a single nonpoint source or activity, the combined effects from all sources contribute, along with impacts from other land uses and activities, to the impairment of beneficial uses of the Tualatin's waters. Pollutant from agricultural lands can reach the Tualatin and its tributaries through one of three means: in solution in rainfall runoff or irrigation return flows, attached to soil particles and transported via erosion, or through solar loading due to lack of riparian vegetation.

2.3.2 303(d) List of Impaired Water Bodies

Oregon's 303(d) list has three main categories: category 4a consists of waters with impaired water quality for which a TMDL has been approved by US EPA; category 5 consists of impaired waters for which a TMDL must be developed; and draft new listings or changes to the existing list which have not yet been approved by EPA.

Many of the impaired waters in the Tualatin basin are now included as category 4a with approved TMDLs. These include both tributary and mainstem Tualatin River listings for water temperature, pH and chlorophyll *a* (addressed by the TMDL for total phosphorus), bacteria, ammonia and dissolved oxygen (addressed by a joint TMDL for ammonia and settleable volatile solids), habitat modification and biocriteria. The latter two impairments are indicators of poor general aquatic conditions for fish and other aquatic life. TMDLs for temperature, dissolved oxygen and total phosphorus were shown to address these aquatic impairments due to their future improvements of water quality and riparian vegetative conditions.

The most recent list approved by US EPA was developed in 2010. This list added several tributary stream miles impaired for low dissolved oxygen during winter spawning. These cannot be categorized as 4a because the existing TMDLs addresses only summer impairments for dissolved oxygen. The list also includes new stream segments with biocriteria impairments and reaches with high concentrations of iron, arsenic and manganese. DEQ has not yet identified a schedule for writing new TMDLs to address these impairments.

At the time of this writing, DEQ has just closed a public comment period for the draft 2012 list. DEQ will address comments, revise the list as necessary, and submit the list to US EPA for approval. Parameters that may be added to category 5, and therefore, may need a TMDL include: arsenic, lead, copper, chromium, thallium, mercury and trichloroethylene.

2.3.3 Basin TMDLs and Agricultural Load Allocations

In August 2001, the US EPA approved the Tualatin Subbasin TMDL for phosphorus, ammonia, temperature, bacteria, and dissolved oxygen. In 2006, DEQ issued a TMDL for mercury for the entire Willamette Basin. These five water quality parameters are extremely important for supporting the beneficial uses in the Tualatin River watershed. See

<http://www.deq.state.or.us/wq/tmdls/docs/willamettebasin/tualatin/tmdlwqmp.pdf> for more information.

Temperature

The 2001 Tualatin TMDL quantified pollutant allocations and allows **no increase in temperature above background from May 1 through October 31**. Because thermal pollution is difficult to measure, the temperature TMDL identified streamside shade as a surrogate measure.

If system potential vegetation is present along streambanks, that reach of stream complies with the TMDL. System potential vegetation describes a condition where vegetation density and height are defined by the kind of native vegetation that could grow in the soil, moisture, and light conditions present at the site.

Bacteria

The 2001 Tualatin TMDL provided different allocations for bacteria in runoff depending on the season, the tributary, and whether samples were taken during a storm. Allocations apply year-round, although allocations differ for dry and wet seasons. The calculation of bacterial loads can guide the selection of management strategies that are designed to reduce the quantity and/or quality of runoff. DEQ encourages the use of management strategies that optimize reduced runoff quantity and improved quality.

Table 2. Bacteria load allocations for agriculture.

5 th -Field Subbasin	<i>E. coli</i> counts/100 mL			
	Summer (May 1 – Oct 31)		Winter (Nov 1 – April 30)	
	During Runoff Events ¹	All other times ²	During Runoff Events ¹	All other times ²
Gales	9500	406	3500	406
Rock	3000	406	700	406
Dairy	7000	406	3500	406
Scoggins/Upper Tualatin	9500	406	1500	406
Middle Tualatin	12000	406	11000	406
Lower Tualatin	12000	406	5000	406

¹ Measured as a mean event concentration

² Measured as a grab sample

Settleable-Volatile Solids

The 2001 Tualatin TMDL requires reductions between May 1 and October 31 in the amount of erodible material that uses up oxygen once that material is delivered to streams. These limits are intended to help increase dissolved oxygen by decreasing the delivery of chemicals that will react with oxygen. These allocations can be met by controlling erosion from both fields and instream sources including bed and bank erosion.

Table 3. Settleable volatile solids load allocations (May 1 – October 31) for agriculture.	
Stream	Load Allocations
Ash Creek, Fanno Creek, Summer Creek	None
Gales Creek, West Fork Dairy Creek, Chicken Creek, McFee Creek, Upper Rock Creek	30% Reduction in Runoff
All other streams	20% Reduction in Runoff

Total Phosphorus

The 2001 Tualatin TMDL set load allocations as instream concentrations of total phosphorus. The concentration limits vary across the tributary basins in the Tualatin Watershed based on the background concentrations of total phosphorus in groundwater, and are applicable during dry season of May 1-October 31. The allocations do not intend for additional total phosphorus to be delivered to streams from human sources. In general, controlling erosion and runoff from fields, using best management practices in applying fertilizers, and covering manure sources should meet the TMDL allocations from agricultural sources.

Table 4. Phosphorus load allocations for agriculture.		
Receiving water body	Total Phosphorus Concentrations (May 1 – Oct 31: Median (mg/L))	Total Phosphorus Concentrations (Daily Maximum (mg/L))
Mainstem Tualatin below Dairy Creek (Unless otherwise specified below)	0.14	0.49
Mainstem Tualatin above Dairy Creek (Unless otherwise specified below)	0.04	0.14
Bronson Creek @ Mouth (205 th)	0.13	0.46
Burris Cr./ Baker Cr./ McFee Cr./Christensen Cr. (all @ Mouth)	0.12	0.42
Cedar Creek/Chicken Creek/Rock Creek (South)/ Nyberg Creek/Hedges Creek/Saum Creek (all @ Mouth)	0.14	0.49
Dairy Creek @ Mouth	0.09	0.32
Fanno Creek @ Mouth	0.13	0.46
Gales Creek @ Mouth	0.04	0.14
Rock Creek @ Mouth	0.19	0.67

Mercury

The Willamette Basin TMDL for mercury includes the Management Area. This TMDL requires a **27 percent reduction in mercury year-round**. Mercury sources that may be influenced by agricultural activity include runoff of atmospherically deposited mercury and erosion of mercury-containing soils. Mercury deposition from the atmosphere and erosion of mercury containing soils are two of the larger sources of nonpoint source mercury in the Willamette Basin. Best management practices that control erosion, filter out runoff, and encourage runoff to infiltrate into the soil instead of flowing into streams will address this source. These practices are similar to those required to meet the TMDLs load allocations for total phosphorus and bacteria.

2.4 Prevention and Control Measures

Currently, water quality related to nutrients and animal waste is improving in the watershed. Most dairy owners in the area have installed conservation systems to manage nutrients. Thanks to the efforts of many

individuals, ammonium is no longer a major concern. Although phosphorus levels have decreased, they remain a concern. There are also ongoing problems with low dissolved oxygen and pesticides.

The Joint Water Commission, a consortium of drinking water providers in the Management Area, developed a five-year action plan that includes monitoring surface waters to identify whether there are pesticides at levels of concern, contributing funds in partnership with the SWCD to properly dispose of unused pesticides, and developing outreach programs with the SWCD to improve pesticide management in the basin.

To improve water quality in the Management Area, phosphorus, ammonia, bacteria, and pesticide levels must be reduced. Excessive temperatures are addressed by providing shade along streams. Reducing erosion will improve water quality conditions for phosphorus, dissolved oxygen, pesticides and mercury. Dissolved oxygen is increased by reducing nutrients and increasing shade.

The Area Plan and Rules focus on controlling pollution at the source. Sources include erosion of agricultural land and streambanks, irrigation water discharges, inadequate riparian vegetation and waste discharges.

ODA's and the SWCD's objectives are to reduce pollution from agricultural and rural lands by:

- Eliminating polluted runoff
- Establishing riparian vegetation

Agricultural landowners are strongly encouraged to implement practices that eliminate polluted runoff from entering waters of the state. The SWCD recommends the following best management practices:

1. Plant grass filter strips to help filter out nutrients and pesticides from fields before entering streams.
2. Utilize nutrient management techniques, including soil testing and applying nutrients at agronomic rates based on the soil tests.
3. Utilize pest management techniques, including IPM, scouting, apply based on label recommendations, reduce drift, monitor weather.
4. Utilize irrigation water management techniques.
5. Annual cover crops to reduce erosion during winter months.
6. Perennial cover crops between crop rows to filter runoff and reduce erosion.
7. No-till on highly erodible lands.
8. Cover manure piles.
9. Do not apply manure to fields during the winter months.
10. Keep livestock out of the streams using fencing.

Streamside landowners are strongly encouraged to plant and maintain native trees and shrubs near streams. Trees and shrubs planted along streams provide multiple benefits to water quality and wildlife habitat.

1. Shade reduces thermal loading reaching the stream.
 - a. Cooler water holds more dissolved oxygen for salmonids and trout.
 - b. Salmon and trout eggs and fry require water that is less than 55 degrees to survive.
 - c. Cooler water reduces the growth of harmful algae, bacteria and other microorganisms.
2. Roots of trees and shrubs stabilize streambanks, reducing erosion and protecting the land base.
3. Vegetated riparian areas encourage runoff to infiltrate the soil, which helps prevent harmful nutrients, waste, and pesticides from entering surface water and groundwater.

In addition to the voluntary strategies above, ODA will use its regulatory authority where appropriate and necessary to gain compliance with required conditions. Any enforcement action will be pursued only when reasonable attempts at voluntary solutions have failed.

2.4.1 Voluntary Measures

The SWCD intends to prevent and control agricultural nonpoint source pollution through volunteer efforts of cooperators. Individual landowners are offered informational, technical, and financial assistance from local, state, and federal agencies.

Strategies include education programs and implementation of conservation practices. These strategies are carried out at the local level by the SWCDs in cooperation with landowners, other agencies, volunteer organizations, and others.

Landowners have flexibility in choosing strategies and practices to address water quality issues on their lands. Landowners may choose to address problems on their own or they may choose to develop a Conservation Plan with the SWCD.

Conservation Practices

Conservation Practices for pollution control are determined to be effective, practical means of controlling and preventing pollution. Conservation Practices are actions taken by each individual agricultural operation for the achievement of production and water quality goals. Appropriate practices for individual farms may vary with the specific cropping, topographical, environmental, and economic conditions existing at a given site. Due to these variables, it is not possible to recommend any uniform Conservation Practices for farms in the Management Area.

A detailed list and description of measures is contained in other documents such as the Field Office Technical Guide (FOTG) maintained by the NRCS. The following is a sampling of effective practices typically used in the Management Area.

Erosion control:

- Residue Management
- Mulching
- Conservation Crop Rotation
- Conservation Cover
- Cover Crop
- Grassed Waterway
- Underground Outlet

Preventing irrigation water discharges:

- Irrigation Water Management
- Irrigation System Tailwater Recovery

Nutrient and pesticide management:

- Pest Management
- Nutrient Management

Streamside and Wetland Habitats:

- Stream Channel Stabilization
- Streambank and Shoreline Protection
- Critical Area Planting
- Filter Strip
- Tree and Shrub Establishment
- Riparian Forest Buffer
- Use Exclusion
- Fence
- Watering Facility
- Animals Trails and Walkways
- Field Border
- Hedgerow Planting
- Windbreak/Shelterbreak Establishment
- Restoration and Management of Declining Habitats
- Wetland Creation
- Wetland Enhancement
- Wetland Restoration
- Wetland Wildlife Habitat Management
- Upland Wildlife Habitat Management
- Stream Habitat Improvement Management

- Critical Area Planting

Preventing waste discharges:

- Roof Runoff Management
- Waste Storage Facility
- Composting Facility
- Manure Transfer
- Heavy Use Area Protection
- Waste Management System
- Closure of Waste Impoundments
- Constructed Wetland
- Waste Utilization

Conservation Practices and land use changes are most effective when selected and installed as integral parts of a comprehensive resource management plan based on natural resource inventories and assessment of management practices. The result is an approach using the Conservation System concept. Conservation Systems use Conservation Practices and land use changes that are designed to be complementary, and when used in combination, are more technically sound than each practice separately.

Conservation Plans

A conservation plan is a customized, detailed guide to help the farm operator manage land profitably while protecting natural resources. Plans address site-specific issues through practices to conserve soil, water, and related plant and animal resources. The purpose of a plan is to help landowners achieve objectives as land and water users and to help them meet water quality requirements.

The SWCD helps develop plans at no cost to landowners. Each landowner makes all decisions on the plan, implements the plan, and has complete control over the activities on their land (within local permitting guidelines). The conservation plan includes a timeline for implementing conservation practices that address the objectives and resource concerns, and specifications or standards for those practices.

Steps to develop a Conservation Plan:

- Identify opportunities or resource concerns
- Assess resources and problems on the property
- Develop and evaluate possible solutions to the problems
- Make your decisions
- Implement the plan
- Evaluate the plan and make adjustments as necessary

Benefits of a Conservation Plan:

- Saves money over the long term as land becomes more productive or retains productivity
- Increases property value
- Enhances open space and wildlife habitat
- Helps meet regulatory requirements
- Improves animal health and productivity
- Improves plant health
- Improves natural resource health for the entire community

Conservation plans may be drawn up by landowners or operators, consultants, or technicians available through the SWCD. At a minimum, plans will outline specific measures necessary to achieve the required conditions outlined below and will be subject to approval by the local SWCD.

Existing agricultural management plans that meet the required conditions of the Area Plan traditionally qualify as authorized conservation plans upon review by the local SWCD. These generally include current NRCS whole farm plans and nursery areas operating under an approved tail-water recovery plan.

2.4.2 Required Conditions

The associated regulations (Oregon Administrative Rules) for the Management Area are cited below for reference.

All landowners must comply with the following requirements. A landowner or operator is responsible for only those conditions caused by activities conducted on land managed by the landowner or operator. Rules do not apply to conditions resulting from unusual weather events or other exceptional circumstances that could not have been reasonably anticipated.

2.4.2.1 EROSION

OAR 603-095-0140(1)

- (a) There must be no visible evidence of erosion resulting from agricultural activities in a location where the eroded sediment could enter waters of the state.
- (b) Visible evidence of erosion consists of one or more of the following features:
 - (A) Sheet wash, noted by visible pedestalling, surface undulations, and/or flute marks on bare or sparsely-vegetated ground; or
 - (B) Active gullies, as described in OAR 603-095-0010(1); or
 - (C) Multiple rills, which have the form of gullies but are smaller in cross section than one square foot; or
 - (D) Soil deposition that could enter surface water; or
 - (E) Streambanks breaking down, eroding, tension-cracking, shearing, or slumping beyond the level that would be anticipated from natural disturbances given natural hydrologic characteristics; or
 - (F) Underground drainage tile outlets that contribute to soil or bank erosion.
- (c) Private roads used for agricultural activities, including road surfaces, fill, ditch lines, and associated structures, must not contribute sediment to waters of the state. All private roads used for agricultural activities not subject to the Oregon Forest Practices Act are subject to this regulation.

a. Indicators of Non-Compliance

Clear non-compliance

- ❖ Visible sediment that enters natural stream areas.
- ❖ Visible erosion from drainage ways as a result of livestock grazing, tillage or the destruction of riparian vegetation by the landowner or occupier.
- ❖ Underground drainage tile outlets either improperly installed or maintained allowing soil or bank erosion to actively occur.
- ❖ Visible formation and/or expansion of channels, gullies or rills.
- ❖ Visible pedestals on bare or sparsely vegetated ground.

Likely non-compliance, requires further investigation

- ❖ Eroding road ditches, drainage ways and field borders.
- ❖ Field swales with high water flow and without crop residues, grass cover or sediment control structures.
- ❖ Highly erodible land with minimal cover.
- ❖ Sediment deposits left from flowing water that are visible away from the ditch or channel.
- ❖ Lack of vegetation in and around drainage ditch.

b. Potentially affected TMDL parameters

Phosphorus, bacteria, dissolved oxygen, mercury

2.4.2.2 STREAMSIDE VEGETATION

OAR 603-095-0140(2)

- (a) Landowners or operators must allow vegetation, consistent with site capability, to become established along perennial and intermittent streams to protect water quality by providing shade, filtering out pollutants from surface runoff, and protecting streambank integrity during high stream flows, such as would be expected to follow a 25-year, 24-hour storm.
- (b) If any agricultural activity disturbs enough streamside vegetation to impair the conditions and functions described in 603-095-0140(2)(a), the landowner or operator must replant or restore the disturbed area with vegetation that will provide the functions required in 603-095-0140(2)(a).
- (c) Agricultural activities are allowed if they do not impair the conditions and functions described in 603-095-0140(2)(a).

a. Indicators of Non-Compliance

Clear non-compliance

- ❖ Active streambank erosion in conjunction with tillage, grazing, or destruction of vegetation by the landowner or occupier.
- ❖ Removal or destruction of vegetation that impedes the goals of shading water, stabilizing banks, and filtering pollutants in runoff during high rainfall.

b. Potentially affected TMDL parameters

Temperature, dissolved oxygen, bacteria, phosphorus, mercury

2.4.2.3 IRRIGATION WATER DISCHARGES

OAR 603-095-0140(3)

Irrigation discharge, both surface and subsurface, that enters waters of the state must not exceed water quality standards or cause pollution of the receiving water.

a. Indicators of Non-Compliance

Clear non-compliance

- ❖ Turbid irrigation water entering waters of the state.
- ❖ Turbid irrigation water exiting underground tile outlets.

Likely non-compliance, requires further investigation

- ❖ Irrigation application that creates surface runoff.
- ❖ Irrigation water applied at a rate that creates surface water turbidity.
- ❖ Irrigation water applied at a rate that results in ponding.
- ❖ Water exiting underground tile outlets.

b. Potentially impacted TMDL parameters

Temperature, dissolved oxygen, phosphorus, ammonia, mercury

2.4.2.4 NUTRIENTS

OAR 603-095-0140(4)

Landowners and operators must store and use feed, fertilizer, manure, and other sources of crop nutrients, in a manner that prevents transport of pollutants to waters of the state.

a. Indicators of Non-Compliance

Clear non-compliance

- ❖ Discolored water from a manure pile entering water

Likely non-compliance, requires further investigation

- ❖ Manure pile adjacent to river

b. Potentially impacted TMDL parameters

Dissolved oxygen, phosphorus, ammonia, bacteria, mercury

2.4.2.5 WASTE

OAR 603-095-0140(5)

Persons subject to these rules must not violate any provision of ORS 468B.025 or ORS 468B.050.

These statutes are described in Section 1.4.4.

a. Indicators of Non-Compliance

Clear non-compliance

- ❖ Runoff flowing through areas of high livestock usage and entering waters of the state.
- ❖ Livestock waste located in drainage ditches or areas of flooding.
- ❖ Fill material (loose soil) placed in or near waters of the state with a visible discharge of sediment entering waters of the state.
- ❖ Livestock feed placed in or near waters of the state with a visible discharge entering waters of the state.
- ❖ Agricultural products with high nutrient residues placed in or near waters of the state with a visible discharge entering waters of the state.
- ❖ Dead animals deposited in or near waters of the state.

Likely non-compliance, needs further investigation

- ❖ Animal confinement areas or waste from agricultural land management or earth disturbing practices located where there is a likelihood of pollutant transport to waters of the state.
- ❖ Animals confined but manure is not collected and stored in a manure storage facility that meets the requirements of field office technical guide standard for Manure Storage Facility or equivalent pollution control system.
- ❖ Animals confined in an unroofed pen that does not meet field office technical guide standard for Heavy Use Protection Area and Filter Strip or equivalent pollution control system.
- ❖ Fill material (loose soil) placed near waters of the state.
- ❖ Livestock feed placed near waters of the state.
- ❖ Agricultural products with high nutrient residues placed near waters of the state.

b. Potentially impacted TMDL parameters

Ammonia, bacteria, temperature, dissolved oxygen, phosphorus, mercury

2.4.2.6 COMPLAINTS AND INVESTIGATIONS

603-095-0180

- (1) When the department receives notice of an alleged occurrence of agricultural pollution through a written complaint, its own observation, through notification by another agency, or by other means, the department may conduct an investigation. The department may coordinate inspection activities with the appropriate Local Management Agency (as defined in ORS 568.906).
- (2) Each notice of an alleged occurrence of agricultural pollution will be evaluated in accordance with the criteria in ORS 568.900 through 568.933, or any rules adopted thereunder, to determine whether an investigation is warranted.
- (3) Any person alleging any violation of ORS 568.900 through 568.933, or any rules adopted thereunder, may file a complaint with the department.
- (4) The department will evaluate and may investigate a complaint filed by a person under section OAR 603-095-0180(3) if the complaint is in writing, signed and dated by the complainant, and indicates the location and description of:
 - (a) The waters of the state allegedly being damaged or impacted; and
 - (b) The property allegedly being managed under conditions violating criteria described in ORS 568.900 to 568.933, or any rules adopted thereunder.
- (5) As used in section OAR 603-095-0180(4), “person” does not include any local, state, or federal agency.
- (6) If the department determines that a violation of ORS 568.900 through 568.933 or any rules adopted thereunder has occurred, the landowner may be subject to the enforcement procedures of the department outlined in OAR 603-090-0060 through 603-090-0120.

Chapter 3: Goals, Objectives, and Strategies

3.1 Goal

Prevent and control water pollution from agricultural activities and soil erosion, and to achieve applicable water quality standards.

This will be accomplished by:

- Restoring and enhancing wetlands and riparian habitat.
- Reducing erosion and sediment delivery from agricultural and rural lands.
- Reducing nutrient loading from agricultural and rural lands.
- Controlling irrigation tail-water discharges to waters of the state.
- Limiting livestock access to streams, wetlands, and the riparian area.
- Ensuring proper animal waste storage and utilization or disposal.
- Minimizing off-site transport and maximize on-site retention and degradation of pesticide materials.
- Achieving 100 percent compliance with the Required Conditions described in this Area Plan.

3.2 Measurable Objectives

The following objectives were developed in cooperation with ODA, DEQ, the LAC, and the Tualatin SWCD. These objectives are specific, measurable, achievable, relevant, and time-driven. They include the collection of baseline data, ongoing monitoring of land and water conditions, and tracking of activities intended to improve water quality. The objectives will be refined over time as more information becomes available and personnel and financial resources change.

A. Riparian conditions on agricultural lands support good water quality

1. At the 2016 biennial review, the SWCD will provide a comparison of stream matrix values from 2005 and 2015.
2. By 2020, 100 stream miles will be enrolled in voluntary incentive-based programs.
3. By 2020, provide estimates of pollutant reductions from those 100 stream miles.

B. Agricultural lands support good water quality

1. At the 2016 biennial review, provide the following to show progress between 1990 and 2015.
 - a. Number of acres with farm plans,
 - b. Miles of stream with restoration projects,
 - c. Bacteria, phosphorus, DO trends over time.
2. At the 2016 biennial review, the SWCD will provide
 - a. The percentage of HEL lands with HEL plans, and
 - b. A strategy for addressing issues identified in that assessment process.
3. At the 2018 biennial review, the SWCD will provide
 - a. An assessment of livestock operations likely to store manure where it can pollute waters of the state, and
 - b. A potential strategy to address issues identified during that assessment.

Focus Areas

The Tualatin SWCD will identify Focus Areas (defined in Section 1.7.3) on an ongoing basis to concentrate efforts and measure resultant improvements.

The current Focus Area is the Dairy-McKay watershed. Results of the assessments and targeted assistance are summarized in Chapter 4 and provided to the LAC at each biennial review.

3.3 Strategies for Area Plan Implementation

The main strategies are to:

- Control pollution as close to its source as possible.
- Base actions on sound conservation planning.

The ODA and the SWCD intend to encourage participation in this water quality improvement program by:

- Providing educational programs to raise public awareness and understanding of water quality issues and solutions.
- Providing incentives for the development and implementation of farm plans.
- Offering technical assistance for the development and implementation of farm plans.
- Inventorying and surveying the watershed for compliance with Required Conditions.
- Pursuing water quality complaints.
- Encourage enrollment in voluntary incentive-based programs.

3.3.1 Education and Outreach

Public outreach has been a focus for the Tualatin SWCD since the original adoption of the Area Plan and Rules in 1996. The Tualatin SWCD continues to make public presentations to interest groups including small acreage farmers and equine operations, whose numbers are steadily increasing in this region. One-on-one site visits provide personalized technical assistance for landowners while monthly articles on agricultural water quality published in the local newspapers reach a wider audience with outreach information.

Additional outreach includes displays at public events, a quarterly newsletter (both print and electronic), and social media. The Tualatin SWCD maintains a website containing information about the SWCD and the services they provide, featured news, and outreach event dates. As always, there is continual partnering with local agencies, watershed councils, and citizen groups to stretch funds and accomplish more on-the-ground conservation.

3.3.2 Conservation Planning and Conservation Activities

As resources allow, the SWCD and USDA NRCS staff are available to assist landowners in evaluating effective practices for reducing runoff and soil erosion on their farms and incorporating these practices into farm plans. Personnel in these offices can also design and assist with implementation of practices, and assist in identifying any sources of cost-sharing funds for the construction and/or use of some of these practices.

Technical and cost-sharing assistance for installation of certain Conservation Practices may be available through traditional USDA conservation programs or through SWCD, grant, or other funding sources.

Coordination of agricultural nonpoint source pollution control activities with federal programs created under the Food Security Act and other federal, state, local, and private initiatives will be critical to the success of the agricultural nonpoint source pollution control implementation activities.

3.3.3 Funding

In the absence of detailed, site-specific inventories of resource problems, quantification of nutrient and sediment loadings and other water quality issues of concern, and unknown workload associated with the development of farm plans, it is difficult to accurately estimate the annual administrative cost of implementing this Area Plan.

To carry out their responsibilities, the SWCD needs support for staff to work on implementation of this Area Plan. Staffing is needed to:

- Conduct educational programs.
- Identify high priority areas for implementation targeting.
- Provide technical assistance for development of farm plans.
- Investigate water quality complaints.
- Provide ongoing evaluation of Area Plan progress toward achieving water quality goals.
- Coordinate planning and implementation activities with other DMAs that have responsibilities for portions of the water quality improvement program.

Resources are also needed to:

- Help identify areas of high pollutant contribution.
- Conduct a water quality monitoring program.
- Produce educational materials.

In addition, availability of funds for a cost-sharing incentive program would catalyze implementation and aid in the adoption of measures that go beyond the minimum requirements.

The SWCD, the ODA, and other cooperating agencies plan to avail themselves to all opportunities to obtain grants, cost-sharing funds, assessments, and monies from any other sources that can be used to accelerate the installation of nonpoint source pollution control practices through the formulation of farm plans. The NRCS Farm Bill, EPA's Clean Water Act Section 319 grants, the Oregon Watershed Enhancement Board (OWEB) grants, and other federal and state programs are potential sources of these funds. Other potential sources include state revolving loan funds and the Small Grants Program through OWEB that assist landowners in implementing conservation practices.

In addition to the USDA grant and cost share opportunities traditionally available to the agricultural community (as well as other grants potentially available such as the OWEB and EPA's nonpoint source implementation grants), stable, long-term funding will be required to operate an agricultural base program for water quality management.

Since 2005, the SWCD has offered two riparian restoration programs through a unique partnership between federal, state, and local agencies in Washington County. These programs involve several partner agencies including Clean Water Services, FSA, NRCS, OWEB, the Freshwater Trust, and Oregon Department of Forestry. The Enhanced Conservation Reserve Enhancement Program (ECREP) and the Vegetated Buffer Areas for Conservation Program (VEGBAC) offer planting assistance, annual payments, and financial incentives to landowners who enroll stream side property.

3.3.4 Monitoring and Evaluation

The SWCD and its conservation partners will conduct monitoring to better quantify current conditions and progress toward meeting the goals and objectives of this Area Plan (see Chapter 4).

DRAFT

Chapter 4: Implementation, Monitoring, and Adaptive Management

4.1 Implementation and Accomplishments

Many conservation activities and implementation monitoring tracks have been implemented to benefit water quality. The SWCD and NRCS track activities that have been implemented through quarterly reports to ODA and through a NRCS database, respectively. Projects that have received funding from the OWEB are tracked in OWEB's restoration database. In addition, partner agencies can submit reports of projects and activities in the Management Area that improve water quality.

Table 5. SWCD Accomplishments (January 2012 – December 2013)	
Strategy for Area Plan Implementation	Activity
Education and Outreach	43 events, reaching 1,905 people
	3 student events, reaching 91 students
	Distributed 2,219 water quality-related handouts
	Sent a newsletter to over 500 people quarterly
	104 site visits
	6,479 landowners contacted or provided w/TA
	14 newspaper articles
Conservation Planning and Conservation Activities	62 conservation plans, 5,181 acres (SWCD and NRCS)
	Implemented 249 projects, 14,861 acres (SWCD and NRCS)
Funding	Leveraged \$3,111,130 from other sources

These Conservation Activities consisted primarily of tree and shrub establishment (and associated practices), cover crops, conservation cover, nutrient management, pest management, irrigation water management, and installment of micro-irrigation systems.

The SWCD, in cooperation with NRCS funding through the Agricultural Water Enhancement Program (AWEP), focused conservation efforts on the Upper Tualatin and Gales Creek watersheds in 2010-2012. The Upper Tualatin and Gales Creek systems supply drinking water to over 500,000 people and irrigation water to 17,000 acres of high value cropland in Oregon's Washington County. The County is one of the fastest growing in Oregon, putting pressure on the water quality, quantity, and habitat of these streams.

Between 2010 and 2012, NRCS and SWCD staff wrote 32 AWEP contracts for a total of \$835,000. Through these contracts, landowners have implemented conservation practices such as planting trees, converting sprinklers to drip irrigation, planting cover crops, utilizing nutrient and pest management practices, and monitoring soil moisture as part of irrigation management.

By planting riparian buffers, the SWCD's restoration programs help protect environmentally sensitive land, reduce streambank erosion, restore wildlife habitat, and safeguard ground and surface water in the Tualatin River Watershed. The ECREP and VEGBAC programs were developed in 2005 through a unique partnership among federal, state, and local agencies in Washington County. These programs involve several partner agencies including Clean Water Services, FSA, NRCS, OWEB, the Freshwater Trust, and Oregon Department of Forestry. Approved farm plans are developed for all landowners enrolled in ECREP and VEGBAC.

During the first seven years of the program, 34 landowners in ECREP and 10 landowners in VEGBAC established riparian buffers on 455 acres along almost 27 miles of stream. In 2013, 11 new

projects were added, totaling 57.7 acres and 5.4 stream miles. That year contractors planted 277,500 trees and shrubs on 29 sites from January to early March.

4.2 Water Quality Monitoring—Status and Trends

Clean Water Services has monitored water quality in the Tualatin River and its tributaries since the early 1990s. In 2012, US EPA compiled results from Clean Water Services' data and identified water quality improvements for chlorophyll *a*, pH, and bacteria in many of the Tualatin watershed subbasins (Figure 4). Improvements in the Lower Tualatin River and the Saum Creek/Lower Tualatin River are partially attributed to improved treatment at wastewater treatment plants. Improvements in most other subbasins reflect reductions of nonpoint source pollution, including the agricultural sector. Many of the monitoring locations are upstream of point source discharges, and thus reflect reductions in nonpoint source pollution.

Some of these reductions are likely attributable to the adoption of agricultural best management practices. While there have been many improvements in agricultural practices since the original 1988 TMDL was adopted, agencies have not maintained detailed databases that could be used to attribute water quality improvements to any particular efforts.

Figure 4. This map was included in one of EPA's TMDL basin success stories, and shows improving trends in water quality measures of total phosphorus, chlorophyll *a*, and bacteria between 1990 and 2010.



Data

collected over the years indicate that bacteria pollution is still a widespread problem across the watershed. Summer concentrations in the Dairy-McKay, Rock and Fanno Creek basins still exceed the TMDL targets for total phosphorus. The 2001 TMDL for temperature identified significant thermal pollution in all of the Tualatin River Watershed Water Quality Management Area Plan June 2, 2014

Tualatin tributaries, with the most extensive heating occurring in the Dairy-McKay subbasin. Riparian planting projects have been implemented across the basin, totaling 10.8 miles. Approximately 124 medium and high priority miles still need to be restored. However, it may take several years to establish sufficient shade density to lower stream temperatures.

4.3 Progress Toward Measurable Objectives

Attaining compliance with the TMDL requirement has proven to be challenging. The establishment of the temperature TMDL and the adjustment of the previous phosphorus TMDL provide new and more reasonable goals for landowners in the Management Area. The progress and success of implementation efforts will be assessed through determination of changes in land use practices and the measurement of water quality changes over time.

Baseline information as described in the Measureable Objectives in Section 3.2 will be provided beginning with the 2016 biennial review.

4.3.1 Focus Area

In July 2013, the SWCD began work in the Dairy-McKay Focus Area. The Focus Area is 88,795 acres and is comprised of five 6th field watersheds within the Dairy Creek 5th field watershed. Agriculture makes up 39 percent of the land use in the area, with 2,878 tax lots. Other land uses include forestry (50 percent) and urban (11 percent). The agriculture area is a mix of dryland and irrigated crops, including high value crops such as blueberries and nursery stock, and field crops such as grass seed and wheat. There are 166.8 miles of perennial streams.

The Dairy-McKay focus area has approved TMDLs for temperature and phosphorous. According to DEQ, temperatures in the Dairy Creek subbasin are well above that required by anadromous fish and phosphorus is above the target level defined in the TMDL. The SWCD will improve water quality for both of these parameters by working with landowners to install riparian forest buffers and grass filter strips.

The SWCD completed a pre-assessment, classifying stream reaches within the focus area using the Stream Matrix (Table 6), which is a GIS tool used by the SWCD and NRCS to guide restoration efforts. The Stream Matrix assesses eight water quality and habitat-related criteria. Each criterion is scored for an individual stream reach and a weighted average of all eight scores gives an overall score for the stream reach. Riparian vegetation condition was evaluated as one of the eight criteria, using aerial photos and field verification.

More weight is given to stream reaches that have poor riparian vegetation and fish presence. Sites with higher overall scores are higher priority sites for restoration projects.

The SWCD's objective is to reduce the percentage of stream miles in Class 4 by 10 percent by 2015 (reduce from 75 percent to 65 percent).

TABLE 6. Riparian condition classification results from 2013.

Class	Class Description	Miles of stream	% of stream miles
1	No restoration needed. Streams are rated low priority in the Stream Matrix (mapped as green) OR trees have been planted on both sides of the stream (mapped as purple). Vegetation likely sufficient to moderate solar heating, stabilize streambanks, and filter out pollutants consistent with site capability.	33.8	20
2	Significant progress has been made in restoration. Trees have been planted on one side of the stream (mapped as purple). Vegetation likely insufficient to moderate solar heating, stabilize streambanks, or filter out pollutants consistent with site capability.	6.2	4
3	Filter strips (herbaceous) have been planted to stabilize streambanks and filter pollutants (mapped as pale green). Agricultural activities likely not allowing vegetation to moderate solar heating.	2.3	1
4	Streams are rated medium or high priority in the Stream Matrix (mapped as yellow or red). Agricultural activities likely not allowing riparian vegetation to moderate solar heating, stabilize streambanks, or filter out pollutants consistent with site capability.	124.4	75

Between July and December of 2013, the SWCD began targeted outreach within the focus area to get landowners with high priority stream reaches interested in riparian restoration projects. Outreach included targeted mailings, follow-up phone calls, and displays at events within the focus area.

4.4 Aerial Photo Monitoring of Streamside Vegetation

Aerial photographs from 2007 and 2012 have been analyzed per the methodology presented in Section 1.8.1. The higher the score, the more trees and shrubs compared to grass and bare ground.

Eight streams were evaluated in 2007; one stream was excluded in 2012. One reach was evaluated on each stream. The length of each reach varied from about three to four miles.

Results from 2007 showed a wide range of conditions among the eight stream reaches. In general, Bledsoe and Wapato Creeks had the least amount of landscape cover within 90 feet of the stream, while Burris and McFee creeks had the most. Landscape conditions at Bledsoe Creek were dominantly grass/agriculture in all six bands, with no band having more than 17 percent trees. Bare agricultural land comprised 3 to 18 percent. Conditions along Wapato Creek were highly variable, with grass/agriculture 45 to 89 percent within each band, tree cover 2 to 14 percent, and bare agricultural land 0 to 35 percent.

TABLE 7. Riparian index scores from analysis of aerial photographs, 2007 and 2012.

Creek	Scores		Comments About Analyzed Reach
	2007	2012	
Bledsoe	31.3	31.1	
Burris	51.8	52.5	10% ditched
Council	40.2	---	Partially bordered by highway; many ponds and swampy areas along channel
Davis	43.8	44.9	60% ditched; five large ponds formed by dams; also relatively untouched riparian areas
Hill	40.9	41.3	30% ditched and appears to be used as irrigation conveyance
McFee	57.9	57.9	Little riparian disturbance
Wapato	32.0	34.5	60% ditched and appears to be used as irrigation conveyance
WF Dairy	40.5	41.8	Little riparian disturbance

By contrast, the landscape of Burris Creek was more consistent among the six bands: grass/agriculture ranged from 35 to 47 percent, tree cover ranged from 39 to 44 percent, and bare agricultural land did not exceed 4 percent. McFee Creek had the highest riparian index score, with tree cover that ranged from 56 to 76 percent, grass/agriculture 12 to 31 percent, and less than four percent of bare agricultural land.

The 2012 data showed few notable changes, other than Wapato Creek. Wapato's score increased by eight percent due to a reduction in bare agricultural land and an increase in grass/agriculture.

4.5 Biennial Reviews and Adaptive Management

The LAC just spent three years working to rewrite the Area Rules and update the Area Plan accordingly.

The LAC also updated the Area Plan with information on the Focus Area and with Measurable Objectives.

ODA received 18 complaints since the last biennial review. Of these, ODA investigated five related to livestock manure and bank trampling, two from sediment from management of drainage ditches, four from sediment from field erosion, and one from removal of streamside vegetation. ODA issued eight letters of compliance, three water quality advisories, and six letters of warning. In addition, ODA received two complaints that were deemed outside of their jurisdiction: activities conducted by a drainage district and erosion from a recreational activity.